I claim:

1. A method of allocating and deallocating memory comprising the steps of:

assigning to each basic unit of user memory a corresponding memory

5   control block;

collecting groups of contiguous available control blocks into linked lists, each list for storing available control block groups having an associated minimum size;

in response to a request for a block of user memory, searching for a linked

10 list having available blocks of user memory at least as large as the requested size;

seizing a block of user memory of the required size and making available any surplus representing the difference between the requested size of memory and the size of the seized block of user memory;

when deallocating memory, testing whether user blocks of memory

15 immediately adjacent to the deallocated block are available and if available merging the available blocks to the block being deallocated to create a merged deallocated block; and

inserting the merged deallocated block into a linked list of available blocks of memory for containing blocks of memory of the size of the merged block;

20 whereby the adding of said surplus block and the process of creating a merged deallocated block helps to avoid fragmentation of memory.

2. The method of claim 1 wherein the step of grouping available blocks of user memory into linked lists comprises the step of:

providing a linked list for each size that is a multiple of a basic block size.

25 3. The method of claim 2 wherein said basic block size is 64 bytes.

4. The method of claim 2 wherein lists are provided for each block size that is a multiple of a basic block size up to some limit and wherein block sizes above said limit are in multiples of a superblock size, said superblock size being larger than said basic block size.

30 5. The method of claim 4 wherein said superblock size is 4K bytes.

6. The method of claim 1 in which the step of collecting available block groups into linked lists comprises the step of grouping available block groups into two-way linked lists.

7. The method of claim 1 wherein the step of searching for a linked list having available block groups associated with user memory at least as large as the requested size comprises the steps of:

ordering said linked lists by size;

finding the linked list having a minimum size at least as large as the requested size; and

subsequently searching over linked lists for blocks of memory larger than the minimum size linked list until a linked list is found having an available block of user memory.

8. The method of claim 1 further comprising the step of:

storing availability bits for each basic unit of user memory;

in case said memory control blocks are inadvertently overwritten, recreating a new set of linked lists from data of said availability bits.

9. The method of claim 1 wherein the memory control blocks are contiguous to each other and located separately from the user memory.

10. The method of claim 1 wherein user memory is in one contiguous block and control memory is in a separate contiguous block and wherein addresses of each basic unit of user memory and each control block are related by a corresponding distance from a starting point of said user memory and said control block memory.

11. Apparatus for allocating and deallocating memory comprising:

means for assigning to each basic unit of user memory a corresponding memory control block;

means for collecting groups of contiguous available control blocks into linked lists, each list for storing available control block groups having an associated minimum size;

means, in response to a request for a block of user memory, for searching for a linked list having available blocks of user memory at least as large as the requested size;

means for seizing a block of user memory of the required size and making available any surplus representing the difference between the requested size of memory and the size of the seized block of user memory;

when deallocating memory, means for testing whether user blocks of memory immediately adjacent to the deallocated block are available and if

available merging the available blocks to the block being deallocated to create a merged deallocated block; and

means for inserting the merged deallocated block into a linked list of available blocks of memory for containing blocks of memory of the size of the

5   merged block;

whereby the adding of said surplus block and the process of creating a merged deallocated block helps to avoid fragmentation of memory.

12. The apparatus of claim 11 wherein the means for grouping available blocks of user memory into linked lists comprises:

10   means for providing a linked list for each size that is a multiple of a basic block size.

13. The apparatus of claim 12 wherein said basic block size is 64 bytes.

14. The apparatus of claim 12 wherein lists are provided for each block size that is a multiple of a basic block size up to some limit and wherein block

15   sizes above said limit are in multiples of a superblock size, said superblock size being larger than said basic block size.

15. The apparatus of claim 14 wherein said superblock size is 4K bytes.

16. The apparatus of claim 11 in which the means for collecting available block groups into linked lists comprises means for grouping available block groups

20   into two-way linked lists.

17. The apparatus of claim 11 wherein the means for searching for a linked list having available block groups associated with user memory at least as large as the requested size comprises:

means for ordering said linked lists by size;

25   means for finding the linked list having a minimum size at least as large as the requested size; and

means for subsequently searching over linked lists for blocks of memory larger than the minimum size linked list until a linked list is found having an available block of user memory.

30   18. The apparatus of claim 11 further comprising:

means for storing availability bits for each basic unit of user memory;

in case said memory control blocks are inadvertently overwritten, means for recreating a new set of linked lists from data of said availability bits.

19. The apparatus of claim 11 wherein the memory control blocks are contiguous to each other and located separately from the user memory.

20. The apparatus of claim 11 wherein user memory is in one contiguous block and control memory is in a separate contiguous block and wherein addresses of each basic unit of user memory and each control block are related by a corresponding distance from a starting point of said user memory and said control block memory.